REMARKS

In the Office Action dated August 21, 2003, claim 9 was rejected under 35 U.S.C. §112, second paragraph, as being incomplete because the Examiner stated it omits a structural cooperative relationship describing how the piezoelectric element can set the mechanical stress of the stiffening element. Claim 9 has been editorially amended to state that the piezoelectric element mechanically interacts with the stiffening element to set the mechanical stress thereof. Details of how this is structurally accomplished are set forth on page 8 of the present specification, however, it is not believed that those details need be included in claim 9 to satisfy the requirements of Section 112, second paragraph. Claim 9 as amended, therefore, is submitted to be in full compliance with all provisions of Section 112, second paragraph.

Claims 1, 2, 8, 10-16, 18 and 19 were rejected under 35 U.S.C. §102(b) as being anticipated by Sato et al. Claims 3-7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sato et al in view of Vavrek et al.

No prior art was applied against claims 9 and 17, however, neither was there any statement that the subject matter of those claims would be allowable if the claims were rewritten in independent form (and, in the case of claim 9, to overcome the rejection under Section 112).

The rejections based on the Sato et al reference, alone and in combination with Vavrek et al, are respectfully traversed for the following reasons.

In substantiating the rejection of claim 1 based on the teachings of Sato et al, the Examiner referred to element or elements 13 disclosed in the Sato et al reference as corresponding to the "stiffening element" of claim 1. To the contrary,

however, the elements 13 in Sato et al are always referred to as "damping means." Those of ordinary skill in the art do not normally understand or expect a "damping means" to operate, or be capable of functioning as, a stiffening element. A damping means, damping element or damper is not intended for the purpose of preventing a vibration from occurring or arising, but is only intended to prevent propagation (i.e. transmission of) that vibration from one location to another. This normally understood definition of a "damping means" is consistent with the usage and structure of the components 13 described in the Sato et al reference. As explained in the paragraph beginning at column 4, line 43 of the Sato et al reference, and as shown in Figure 4 of that reference, the vibrating force produced by the operation of the gradient coils is referred to as F_{in}, and nothing about the damping means 13 does anything to preclude the generation of that force. The damping means 13 merely absorbs energy associated with that force so that F_{out} is significantly less than F_{in}.

Moreover, it is clear that the damping means 13 in the Sato et al reference are disclosed *between* the gradient coil and the basic field magnet, whereas claim 1 of the present application requires stiffening elements heterogeneously arranged *in* the gradient coil system.

Additionally, there is no description or discussion whatsoever in the Sato et al reference of the generation of an oscillatory mode in the gradient coil system, and therefore there is no discussion in that reference of the damping means 13, or any other components, for reducing at least one oscillatory mode of the gradient coil system. The explanation of the generation of the forces in the Sato et al reference provided at the aforementioned paragraph beginning at column 4, line 43, is merely

a general explanation of the generation of Lorentz forces, and therefore the damping means 13 described in the Sato et al reference at most can be said to generally counteract such Lorentz forces. Whether they do so by suppressing or reducing at least one oscillatory mode of the gradient coil system is nowhere discussed in the Sato et al reference.

Applicant submits that all of these significant differences between the subject matter of original claim 1 and the teachings of the Sato et al reference should be sufficient to distinguish claim 1 and the claims depending therefrom over the teachings of that reference. Nevertheless, claim 1 has been editorially amended to explicitly state that the stiffening elements reduce the oscillatory mode by mechanically stiffening the gradient coil system. Applicant submits this function was inherent in the meaning of the term "stiffening elements" in original claim 1, however, since this function has now been explicitly stated in claim 1, it is clear that the damping means 13, nor any other element, in the Sato et al reference does not and cannot perform that function.

Since the Sato et al reference does not disclose all of the elements of claim 1 as arranged and operating in that claim, it does not anticipate claim 1, nor does the Sato et al reference anticipate any of dependent claims 2, 8, 10-16, 18 or 19. All of those dependent claims add further structure to the novel combination of claim 1, and therefore are not anticipated by the Sato et al reference for the same reasons discussed above in connection with claim 1.

As to claims 3-7, the Examiner relied on the Vavrek et al reference as teaching a firm attachment of the gradient coils to the bore tube, restrained by laminated epoxy and glass fiber. The Examiner stated it would have been obvious to

a person of ordinary skill in the art to further strengthen and secure the gradient coils with glass fiber strands in order to reduce acoustic noise generated by the flexing of the gradient windings. Applicants respectfully submit that the Sato et al reference and the Vavrek et al reference teach structures that are incompatible with each other, and that operate based on mutually exclusive theories. Attempting to modify the Sato et al reference in accordance with the teachings of Vavrek would destroy the intended operation of the Sato et al reference, and therefore such a modification is not a permissible basis for supporting a rejection under 35 U.S.C. §103(a).

As noted above, the manner by which the Sato et al reference is intended to operate is to allow vibrations of the gradient coil to arise, but to prevent propagation of those vibrations to other components. As such, the damping means 13 must be disposed *between* the gradient coil and the element from which it is intended to prevent the vibrations from reaching. In order to serve their intended purpose, the damping means 13 must be able to be deformed to a certain extent by the vibrations. Any effort to make the damping means 13 in the Sato et al reference stronger and more rigid would destroy the intended operation thereof, since this would preclude, or significantly reduce, the ability of the damping means 13 to be deformed. Of course, it may be possible to employ the rigid mounting disclosed in Vavrek et al *in addition to* the damping means 13 disclosed in the Sato et al reference, but not as a part of the damping means 13. Claims 3-7 of the present application, by contrast, describe further limitations or structure of the stiffening elements themselves, and do not refer to some structure other than the stiffening elements which would serve to augment the operation of the stiffening elements.

This point also serves as evidence that the damping means 13 of Sato et al reference do not and cannot operate in the same manner as the stiffening elements of the claims of the present application. This is because, consistent with the above discussion, it makes sense to strengthen or rigidify the stiffening elements of the subject matter of the present application, but doing so to the damping means 13 in the Sato et al reference would actually worsen the functioning of those components for their intended vibration damping purpose.

Claims 3-7, therefore, would not have been obvious to a person of ordinary skill in the art based on the teachings of Sato et al and Vavrek et al.

All claims of the application are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,

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